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10/691,590	10/24/2003	Sunil Kochhar	88265-6820	2216
28765	7590	01/03/2006		
WINSTON & STRAWN LLP 1700 K STREET, N.W. WASHINGTON, DC 20006			EXAMINER WORLEY, CATHY KINGDON	
			ART UNIT	PAPER NUMBER
			1638	

DATE MAILED: 01/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.



## DETAILED ACTION

### *Restriction/Election*

1. In response to the communication received on Oct. 26, 2005 from Robert M. Barrett, the election with traverse of group II, claims 5-11 and 19-20 as they relate to SEQ ID NOs. 1 and 3, is acknowledged. The applicant traverses the restriction on the grounds that there would not be a serious burden if the claims drawn to the polypeptides were rejoined with the claims to the polynucleotides. In addition the applicant argues that searching additional sequences would not be a serious burden. These arguments are not persuasive because the literature encompassing the synthesis or purification of polypeptides is different than the literature encompassing the polynucleotides. For instance, a fractionation of an extract could read on a polypeptide claim even without the amino acid sequence being disclosed in the reference. The search for additional sequences is also burdensome because each sequence search takes a large amount of computer time due to the size of the databases being searched. In addition, the output for each sequence search must be evaluated by the examiner, and evaluating the data from additional sequence searches is, indeed, a serious burden. Claims 1-4 and 12-18 are withdrawn from consideration. Claims 5-11 and 19-20 will be examined as they relate to SEQ ID NO:1 and SEQ ID NO:3.

### *Specification*

2. The use of the trademarks SPEEDVAC and BIORAD has been noted in this application. They should be written in all capital letters wherever they appear and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

#### *Claim Objections*

3. Claim 5 is objected to because of the following informalities: the wording is awkward. Applicant is advised that "isolated or synthesized nucleotide sequence encoding the polypeptide identified by SEQ ID NO:1" should be amended to recite - - isolated or synthesized polynucleotide comprising a nucleotide sequence encoding the polypeptide of SEQ ID NO:1 - - . Appropriate correction is required.

4. Claim 6 is objected to because of the following informalities: the claim should specify the cell is a non-naturally occurring cell. Applicant is advised to insert the word - - transformed - - between "a" and "cell".

#### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 5-11 and 19-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 5-11 and 19-20 are drawn to polynucleotides, vectors, transformed cells and plants, and methods of producing cocoa beans with increased cocoa flavor peptides.

The nature of the invention is the isolation of peptides from cocoa beans.

The specification discloses the isolation of peptides from cocoa powder (see pages 6-8, in particular). The specification discloses the N-terminal sequence of two peptides (see page 9, Table 2, in particular). The specification discloses that these small peptides are fragments of larger proteins derived from the 67 kDa vicillin protein (see page 9 lines 11-17, in particular). SEQ ID NO:1 is disclosed to be the amino acid sequence of a 47 kDa fragment of the vicillin protein (see page 9 lines 14-17, in particular). SEQ ID NO:3 is a subsequence of SEQ ID NO:1 and is disclosed to be the amino acid sequence of a smaller fragment of the vicillin protein

that occurs as a result of the fermentation process (see page 9, Table 2, in particular).

The specification does not disclose any taste tests performed on cocoa powder made from transgenic cocoa beans that have been engineered to express the peptides. Transgenic cocoa beans have not been produced that express SEQ ID NO:1 or fragments comprising SEQ ID NO:3. The prior art teaches that cocoa flavor is produced by the fermentation of cocoa beans followed by heat treatment in the presence of reducing sugars (see Roedel et al. (1988) Formation of cocoa flavor by the Maillard reaction. *Charact., Prod. Appl. Food Flavours*, pp. 301-309, see page 301, in particular). Roedel et al. teach that the flavor requires the presence of peptides in addition to free amino acids (see page 301 first paragraph, in particular). Roedel et al. teach that the source of protein to generate the peptides is important. For example, protein from yeast resulted in cocoa with a yeasty off-flavor, proteins from faba bean resulted in a beany off-flavor, and there was a bitterness when proteins from whey, egg, wheat, maize, or *Vicia faba* were used (see page 302, in particular). Roedel et al. teach that the use of gelatin to generate the required peptides yielded flavor that was closer to natural cocoa flavor (see page 308, figure 6, in particular). These data suggest that it would be highly unpredictable to utilize protein or peptides derived from any other source, other than a cocoa plant, to produce cocoa flavor.

Kochhar et al. teach that apart from the identification of certain hydrophobic amino acids, little is known about the nature and type of peptides generated from cocoa seed proteins that are important in the generation of cocoa flavor (Kochhar et al. (2001) J. Agric. Food Chem. Vol. 49, pp. 4470-4477, see page 4476, right column, in particular). Hansen et al. teach that high flavor cocoa beans (genotype PA7) have the highest endoprotease, aminopeptidase, and carboxypeptidase activities of all genotypes tested (Hansen et al. (2000) J. Science of Food and Agric. Vol. 80, pp. 1193-1198, see page 1197, right column, in particular). Hansen et al. also teach that for cocoa flavor reducing sugars, amino acids, and peptides are required, and the correct amount and ratio of these flavor precursors are essential for optimal production of flavor volatiles during the roasting process (see page 1193, left column, in particular). Therefore, although the data in the instant application demonstrate that the recited peptide is one of the peptides in the mixture often referred to as "flavor precursors", there are no data to show that increasing levels of this peptide, alone, would generate improved cocoa flavor. Because it is known that free amino acids are required as well as peptides, and Hansen et al. teach that the ratio of these compounds is important, then, in the absence of any further guidance one could not predict the effect that an increase in one peptide would have on the overall cocoa flavor. In the absence of any further guidance, it would require undue experimentation on the part of one of skill in the art to determine if other peptides need to be added, and if extra free amino acids need to be added, to generate an

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appropriate ratio of ingredients to optimize cocoa flavor. Therefore the specification has not enabled one of skill in the art to make and use the invention as claimed.


6. Claims 5-11 and 19-20 are free from the prior art, because the prior art does not teach or fairly suggest the sequence of SEQ ID NO:1 or SEQ ID NO:3.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy K. Worley whose telephone number is (571) 272-8784. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CKW  
Dec. 21, 2005



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PRIMARY EXAMINER